Table showing the Expectation of Life (continued).

Age.	By Dr. Farr's English Life Table. Males.	By C. M. Willich's proposed Hypothesis.	Age.	By Dr. Farr's English Life Table. Males.	By C. M. Willich's proposed Hypothesis.
	Years.	Years.		Years.	Years.
31	32·53	32·66	46	22·48	22·66
32	31·85	32·00	47	21·82	22·00
33	31·17	31·33	48	21·17	21·33
34	30·50	30·66	49	20·52	20·66
35	29·82	30·00	50	19·87	20·00
36	29·15	29·33	51	19·22	19·33
37	28·47	28·66	52	18·58	18·66
38	27·80	28·00	53	17·94	18·00
39	27·13	27·33	54	17·30	17·33
40	26·46	26·66	55	16·66	16·66
41	25·79	26·00	56	16·02	16·00
42	25·12	25·33	57	15·39	15·33
43	24·46	24·66	58	14·77	14·66
44	23·79	24·00	59	14·18	14·00
45	23·13	23·33	60	13·60	13·33

A Chapter in Fire Insurance: "*Specific*" *and* "*Average.*" By
THOMAS MILLER, *of the Scottish Union Assurance Society.*

[Read before the Institute of Actuaries, 28th February, 1859, and ordered by the Council to be printed.]

ACCORDING to present practice, when property is insured, both by average and by specific policies, the latter have to bear ·the whole of any loss which may occur, unless it exceed the total amounts which they insure; and, in that case, the excess of loss over the amounts they insure is covered by the average policies, and is subject to average at the settlement of the claim.

As it may be deemed advisable by the Offices, at some future period, to make average and specific policies bear proportionate shares of loss on property jointly insured by them, it is proposed to determine the rules by which their respective proportions may be ascertained.

All policies, whether specific or average, contain a condition to the effect that Offices insuring the same property shall be liable to make good rateable proportions of loss—that is, they are bound to bear shares of loss proportioned to the relative amounts insured; and the legislature has enacted, that a person's loss is the utmost amount he can legally recover under the insurance. With these

principles as guides, the solution of the question under consideration is not difficult.

If loss occur on property covered by a policy subject to average, the amount insured of the loss is found thus :—As the total value of the property insured is to the sum insured, so is the amount of loss which has occurred to the sum insured by the policy on the property destroyed. The last term, therefore, represents the whole amount insured at the time of the fire on the property which has been lost. It is a specific sum insured on the particular property destroyed, and applicable in the first place to the insurance of it alone. It is either greater, equal to, or less than the amount of loss, according as the total sum insured by the policy is greater, equal to, or less than the total value of the property covered. If it exceed the amount payable under the policy, the balance merges into the average insurance, and is liable to bear its share of any subsequent loss occurring during the currency of the policy.

Should loss occur on property insured by more than one average policy, and the condition be cancelled which gives a precedence to specific policies in the payment of a claim, then the Offices would require to bear shares of the loss in proportion to the respective sums insured on the property destroyed, which sums would be the specific amounts insured on that property, as found by the condition of average, in the manner shown above.

In conformity with the condition of rateable apportionment of loss, the rule of bringing the *whole sums insured* to bear upon *each* claim is imperative under specific policies, even when the limits of the insurances are not concurrent. Thus, if one policy insure stock alone at £1,000, and another stock and utensils at £1,000, and the loss be on stock only, each will bear one half its amount. The amounts insured by specific policies are, therefore, specific sums which cover first any loss which may occur, and if they exceed the amount of that loss, the balances are liable to bear their shares of subsequent loss occurring before expiry of the policies.

Specific insurances by average and by specific policies, are, therefore, intrinsically alike, and differ only in the laws by which their amounts are ascertained; but these amounts, when actually ascertained, would meet loss in precisely the same way; so that the natural share of loss to be borne rateably by average and specific policies jointly insuring the same property, would be found in the following way :—

RULE.—*Loss to be borne by policies, whether specific or average, in proportion to the respective specific sums insured on the property*

burnt; which specific sums, in the case of average policies, are the amounts of loss multiplied by the respective total sums which they insure, and divided by the total values of the property respectively covered by them; and which specific sums, in the case of the specific policies, are the respective sums insured by them.

For the sake of completeness, it may be noticed, that, were the specific insurances, whether by average or by specific policies, not concurrent in their limits, and should loss occur on more than the concurrent portions of the risks, then the specific sums insured would, for the purpose of settlement, be divisible into parts, proportional to the divisions of the loss. And further, should it be found, on trial, that loss would remain unsettled, while any of the specific *policies* insuring the property would be unexhausted by loss, then the relative proportions of the sub-divisions of the sums insured by specific *policies* would require to be re-adjusted, so that, by proportional deductions from those in excess, the deficiencies of the others might be supplied, and the obligation of specific *policies* to meet the whole loss, up to the sum insured, be made to harmonize with the condition of rateable payment of loss. The specific sums insured by the average policies would, however, be fixed unalterably by the condition of average, so that no change could be made in them.

The following is an apportionment of loss, illustrating the different operations which have been alluded to :—

There are three warehouses, A, B, and C—

Office P insures £3,000, average, on sugar, in A and B.
  ,,   Q   ,,   £1,250, ditto,   on sugar and coffee, in B and C.
  ,,   R   ,,   £1,800, ditto,   on sugar and coffee, in A, B, and C.
  ,,   S   ,,   £1,000, specific, on sugar, coffee, and spices, in B.
  ,,   T   ,,   £750, ditto,   on sugar and spices, in B.

Loss in B.
On sugar, £2,000; coffee, £1,000; spices, £1,000.

At the time of the fire, merchandise to the values noted below was stored in these warehouses :—

	In A.	In B.	In C.
	£	£	£
Sugar	4,000	2,000	1,000
Coffee	. .	1,000	1,000
Spices	. .	1,000	1,000
	4,000	4,000	3,000

The specific sums insured by the average policies on the property burnt would, by the preceding rule, be found thus :—

P, on sugar, £2,000 × 3,000 ÷ 6,000 = £1,000;

that is to say, the loss on sugar *multiplied* by the sum insured by P, and the product *divided* by the total value of the sugar within the limit of P's insurance. In a similar way, the specific sums insured by the other average policies on the property burnt may be found, viz.:—

Q, on sugar, £2,000 × 1,250 ÷ 5,000 = £500.
　　on coffee, 1,000 × 1,250 ÷ 5,000 = 250.
R, on sugar, 2,000 × 1,800 ÷ 9,000 = 400.
　　on coffee, 1,000 × 1,800 ÷ 9,000 = 200.

The limits of the specific policies not being concurrent, the sums which they insure require to be divided into partial specific amounts, proportional to the divisions of the loss. Whence, in the case of S, we find a policy insuring sugar, coffee, and spices, the total loss on which is £4,000, so that we have this proportion :—

Total Loss.		Loss on		Sum insured by S.		The proportional divisions of sum insured by S.
£4,000	:	Sugar £2,000	::	£1,000	:	£500 on sugar.
4,000	:	Coffee 1,000	::	1,000	:	250 on coffee.
4,000	:	Spices 1,000	::	1,000	:	250 on spices.

By a similar process of calculation, the proportional divisions of sum insured by T, appear to be—

£500 on sugar; £250 on spices.

By arranging the particulars which have been found in a tabular form, we are enabled, at a glance, to see the results :—

| | Proportional Amounts Insured Specifically by | | | | | | Loss. | |
| | Average Policies. | | | Specific Policies. | | | | |
	P.	Q.	R.	S.	T.			
Sugar	1,000	500	400	500	500	= £2,900	£2,000	Excess, £900.
Coffee	..	250	200	250	..	= 700	1,000	Deficiency, £300.
Spices	..	..	..	250	250	= 500	1,000	Deficiency, £500.

This arrangement would leave loss on coffee and spices unsettled, while the specific policies of S and T, insuring these articles, would be unexhausted by the loss. Hence, in accordance with the rules of specific policies, the deficiencies must be supplied

by proportionate contributions from the amounts in excess. As
P, Q, and R insure together £1,900 on sugar, the amount which
must be got from S and T, to make up the loss of £2,000, is only
£100—so that their joint excess on sugar is £900. As each
of these last insures £500 on the sugar, its individual share of
the £100 is £50, leaving £450 as the sum which each *has to*
spare to meet the deficiencies of the other items. T has to con-
tribute its share of a deficiency of £500 on spices; S its share of
a deficiency of £800—£500 on spices and £300 on coffee—so
that the amounts which the latter has to spare to meet the de-
ficiencies on these separately, are found thus :—

<div align="center">

Sum applicable to diminish deficiency.

£800 : £300 :: £450 : £168·75 on coffee.

800 : 500 :: 450 : 281·25 on spices.

</div>

But the £281·25 on spices has only to contribute a *proportion*
of the deficiency of £500 on that item, along with T's £450.
Wherefore £281·25 + £450 =

<div align="center">

£731·25 : £281·25 :: £500 : £192·3 = amount required from the
excess of S to make up
the deficiency on spices.

731·25 : 450· :: 500 : 307·7 = do., do., from T's excess.
_____
500·0

</div>

In viewing these results, it appears that of T's excess of £450,
a sum of £307·7 is required to make up the deficiency of its pro-
portional sum insured on spices, and the difference between the
two amounts being £142·3, is free to bear its proportion of the
loss on sugar, along with the £50 which had been left as its pro-
portional amount insured thereon. This will make its divisional
sums to be—on sugar, £192·3, and on spices, £250 + £307·7 =
£557·7; together, £750, as in the policy.

With regard to the sum of £168·75, which has been assigned
as S's proportion of the £450 in excess, applicable to diminish the
deficiency on coffee, it appears that it still leaves a deficiency on
that item of £131·25, while the policy would yet be unexhausted.
As, by the obligation of specific policies, loss must be paid as far
as the amount insured, that policy is bound to make good such
deficiency on coffee so far as it can.

The amount insured on sugar, by P, Q, and R, being £1,900,
and by T, as already seen, after providing for the loss on spices,
£192·3—together, £2,092·3—the loss of £2,000 on that article
is fully provided for, even without any contribution from S; there-

fore, the policy of the latter is thus enabled to make up the whole deficiency on coffee, and its divisional amounts will be — on sugar, £7·7; on coffee, £550; and on spices, as already found, £250 + 192·3 = £442·3—together, £1,000, the total amount which it insures.

We are now enabled to give the following as the exact apportionment of the loss, each of the policies bearing proportionate shares :—

	SPECIFIC SUMS.					Loss.	TO BE PAID BY					TOTALS.
	Average Policies.			Specific Policies.								
	P.	Q.	R.	S.	T.		P.	Q.	R.	S.	T.	
Sugar	1,000	500	400	7·7	192·3	2,000	952·4	476·2	380·9	7·3	183·2	2,000
Coffee	..	250	200	550·0	..	1,000	..	250·0	200·	550·0	..	1,000
Spices	..	..	..	442·3	557·7	1,000	..	..	..	442·3	557·7	1,000
	1,000	750	600	1000·	750·	4,000	952·4	726·2	580·9	999·6	740·9	4,000

The preceding example of adjustment, which is as complex as any likely to occur in practice, has been selected for the purpose of illustrating the various topics which have been introduced into this paper,—viz., the fact that specific sums are insured by average policies, and how these sums may be found; the plan of subdividing the amounts insured by specific policies, and the method of reducing the deficiencies of any such subdivisions by proportionate contributions from those in excess, so that the rule of proportional payment of loss may harmonize with the obligation of specific policies to pay loss as far as the sums insured; the practicability of making average and specific policies bear together rateable proportions of any loss which may occur on property jointly insured by them; and the natural rules for fixing these proportions as deduced from the principles of average and specific insurance.

It would be well to bear in mind that the assured has no right, in any case, to *select* the Office upon which he can make his claim, as, by the conditions of the policies, no Office is bound to pay more than a rateable proportion of the loss. Neither has one Office a title to object to a subdivision of the sums insured by another when such subdivision is made in conformity with the conditions of the others' policy, as each policy is dependent for what it insures upon its own terms and conditions. But it is

the loss which arbitrates between different Offices; and each policy, subject to its own conditions, has to be placed into the position which will enable it, in due proportion with the others, to discharge its obligations *with best effect to the loss.*

Had there not been some forgetfulness of first principles in the apportionment of claims, it may be surmised that the additions would not have been wanted which have been made from time to time to the average clause. It is a mistake to divide loss in proportion to *liabilities,* as the conditions provide that the division is to be made " *according to the several sums insured;*" * and when policies are concurrent in their terms and limits, this rule has *invariably* been respected, so that there can be no doubt whatever as to the interpretation which should be given to it. If that interpretation be correct, then it is only in proportion to *sums insured* that loss should be borne. The *independent liabilities* of the new average policies are really the *specific sums they insure,* and the name they have received has been given them under the mistaken idea that they are *necessarily* the amounts for which the Offices are *liable.* Fire insurance *liability* has had many different meanings affixed to it. In some instances it has been supposed to be *the sum insured;* in others, *the sum insured increased by any required amount;* in others, *the sum insured repeated several times;* or, *the whole amount of loss as far as the sum insured;*—but none of these interpretations are correct, as the policies give the true meaning; and they state that it is merely *an obligation* under which the Offices come to pay the whole or some proportion of loss, should one occur.

On the Settlement of Losses by Fire under Specific and Average Policies, Separate and Combined. By DAVID CHRISTIE, *Esq., of the Sun Fire Office.*

[Read before the Institute of Actuaries, 28th March, 1859, and ordered by the Council to be printed.]

A NOTE of alarm has been sounded at the present mode of adjusting fire losses under average policies; and it will be well, though for other reasons, hereafter to be explained, than those to which it owes its origin, that it be not allowed to die away without some effort to gain additional vantage-ground towards the substitution of a comprehensive and reasonable scheme

* *Vide* Conditions of the " Royal Exchange" and the " Union."